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Hydrology and Earth System Sciences Discussions

Interactive comment on "Soil moisture-runoff relation at the catchment scale as observed with coarse resolution microwave remote sensing" *by* K. Scipal et al.

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The paper by Scipal, Scheffler & Wagner is a bold, broad-brush attempt to link remotely sensed soil moisture (SM) at the large catchment scale to runoff (Zambezi) by comparing contemporaneous and appropriately lagged ten-day accumulated flows to the SM estimates obtained at ten-day intervals.

The paper gives a useful review of previous work in the subject area of remote sensing of SM and draws attention to the extensive 8-year long data-base of global SM estimates in their web-site. This was calibrated against some extensive ground-truthing measurements, and the results extrapolated to the Zambezi basin in Zambia. Some intelligent flow-rate checking was performed using inter-comparisons of records from

several gauging sites.

The functional relationships between the flows and the SM (as summarized by an average SM statistic they call a Basin Water Index, or BWI) are highly non-linear, but the data lie about the best-fit curves remarkably closely. Of additional interest is that the delay time between the peak of the flow and the BWI curves shown in Figure 6 varies with accumulated catchment area. A quick check of this in comparison to the surface response as measured by a time of concentration, shows that the soil water response is nearly an order of magnitude slower, as one might expect. As suggested in the paper, these ideas give some comfort to those attempting to incorporate the highly variable, scale-dependent, inhomogeneous and dynamic estimates of SM with other catchment properties in the quest for meaningful rainfall-runoff modeling paradigms.

The paper makes a good contribution to the literature in the field and should be published as is with minor textual corrections as listed below against page and line number.

419:23 ‘extent’; 419:13 ‘emphasize’; 419:23 ‘allow one to’; 423:11 ‘ question of how’; 424:16 ‘hydrologically’; 424:20-21 ‘time series ensemble of data’; 425:2 ‘study are taken’; 427:26-27 ‘reaches a width Ĕ river length is 3000’; 433:18 ‘Aside from a’

Geoff Pegram. 22 April 2005

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 417, 2005.